Amendments to the Specification:

Please replace the paragraph beginning on page 1, line 2, with the following amended paragraph:

The invention generally relates to digital transmission systems. In particular it relates to a method of resource optimization in a transmission system for transmitting simultaneously from the same emitting entity at a global transmission power a set of various multiplexed services having specific predetermined error rate requirements that ~~are be~~ are satisfied through adjusting and balancing individual transmission powers.

Please replace the paragraph beginning on page 1, line 12 with the following amended paragraph:

The UMTS mobile radio system allows to multiplex on the radio interface various simultaneous services having various Quality of Service (QoS) requirements and bit rates, such as e.g. voice, video, circuit-switched data and packet-switched data services. The mobile physical layer has been designed to support such service diversity and to provide the required QoS. This QoS is obtained by applying a specific modulation and coding scheme. It can be measured in terms of Bit Error Rate (BER) or Block Error Rate (BLER). For example, a speech or voice service generally requires a BER of 10.sup.-3, while a video service would require a BER of 10.sup.-6. For each service considered the quality of transmission is measured on reception by a BER or BLER. This BER or BLER is [[tight]] tied to a ratio of Energy per bit over spectral density of Noise (E_b/N_0) and adjustment of individual transmission power corresponding to this service is a means to influence this E_b/N_0 ratio. In the context of the invention, all services are multiplexed on a same common Coded Composite Transport CHannel (CCTrCH) having a global transmission power. The reception quality of the CCTrCH is measured on reception by a global quality factor defined as a ratio of Energy per symbol over spectral density of Noise (E_s/N_0), which is a combination of all individual quality factors (E_b/N_0 ratios). Therefore, adjusting the global transmission power and obtaining an E_s/N_0 on reception,

that is optimal for all services becomes a difficult task when multiplexing two or more services of different kinds. Moreover, obtaining too high an E_s/N_0 ratio on reception would waste radio resources and could cause saturation of the cell more rapidly while inefficiently wasting global transmission power of the emitting entity, e.g. mobile equipment, and increasing the interference level. Indeed in interference-dominated systems like Code-Division Multiple Access (CDMA) ~~systems radio~~ systems a radio resource is ~~tight~~ tied to the ratio between the useful received power from a given emitting entity to the sum of noise and interference powers. Resource ~~optimiation~~ optimization consists of optimizing the resource share of each user and its E_s/N_0 ratio on reception. Optimizing the E_s/N_0 ratio, and consequently global transmission power, requires readjustment of individual E_b/N_0 quality factors of the different services by means of optimal balancing of the associated individual transmission powers along with optimal adjustment of the global power. A specific procedure, known as the rate matching procedure, is described in the document by 3GPP (3rd Generation Partnership Project) referred to under number 3GPP Technical Specification 25.212, Multiplexing and: Channel Coding (FDD). It is meant to enable matching the sum of the coded bits data rates to the data rate of the common Coded Composite Transport Channel (CCTrCH) in uplink transmission on the one hand and to enable balancing the individual transmission power of multiplexed services on the CCTrCH on the other hand. Different techniques based on rate matching coefficients formed the basis of the 3GPP rate matching parameters determination algorithm described in the cited 3GPP Technical Specification 25.212. Such techniques are described, e.g. in European patent applications published under numbers EP 1 047 219 A1 and EP 1 069 798 A1. These RM coefficients are related to a number of bits to be repeated or punctured during transmission of a given service. In the algorithm presented in the cited 3GPP Technical Specification 25.212 and in the 3GPP Technical Specification 34.108, Common Test Environments for User Equipment Conformance Testing, the RM values are fixed by the UMTS Terrestrial Radio Access Network (UTRAN) as a semi-static factor, denoted RM, associated to the given services (see for instance typical configurations of the radio interface in 3GPP Technical Specification 34.108). Actually, these parameters do not depend only on the type of service, but also on the service conditions, including its current data rate and coding

scheme for error protection, and on the transmission environment or noisy conditions. In the cited patent applications as well as in the 3GPP Technical Specification 25.212 and 3GPP Technical Specification 34.108, the values of the semi-static RM coefficients are predetermined and stored in a table, which cannot cope with the variability of real current environment and service conditions of the mobile equipment.

Please replace the paragraph beginning on page 4, line 33 with the following amended paragraph:

FIG. 2 shows in greater detail the data processing and multiplexing chain used in the physical layer for uplink transmissions, as described in the cited 3GPP Technical Specification 25.212. Information bits are exchanged periodically with layer 2 on each TrCH by means of transport blocks (MAC SDUs) at the beginning of each Transmission Time Interval ~~(TTIX~~ (TTIX) as described in 3GPP Technical Specification 25.302, Services Provided by the Physical Layer. The first physical layer operation on transport blocks consists of the addition of a frame check sequence which will be used on reception to detect residual errors in transport blocks after channel decoding. The blocks referenced on FIG. 2 are indicated in the text with acronyms between brackets. After CRC attachment (CRC), transport blocks are serially concatenated (CONC/SEG) providing the channel coder with bigger code block size. The next operation is channel coding (CHN COD). For reason of mobile implementation complexity, only four coding options have been retained to provide the targeted BER or BLER: rate 1/2 or 1/3 convolutional coding, rate 1/3 turbo coding or no coding. Segmentation into smaller equally sized code blocks is performed before channel encoding whenever the output of the transport concatenation unit size is bigger than a channel coder specific limit (504 bits for convolutional coding and 5114 bits for turbo coding). This limitation on code block size was specified as a result of the underlying decoding complexity/performance tradeoff.

Please replace the paragraph beginning on page 7, line 4 with the following amended paragraph:

Rate matching holds a key role for differentiating the quality of transmission of the multiplexed services. The following paragraph analyses this fundamental feature of the UMTS FDD physical layer. WCDMA technology highly relies on the efficiency of the power control mechanism to guarantee a sufficient quality level on the provided physical control and data channels as described in the article by K. S. Gihousen et al.:"On the Capacity of a Cellular CDMA System" published in IEEE transactions on Vehicular Technology, vol. 40, n.degree.2, pages 303-312, May 1991. For power control implementation simplicity, accuracy and robustness, a single mobile-specific Signal to Interference Ratio (SIR) target and hence a single quality user data stream (CCTrCH) is provided for each mobile in the uplink of the UMTS. Therefore, all the CCTrCH bits are received with a unique E_s/N_0 ratio of energy over spectral noise density (including interference), from which the differentiated quality objectives of each TrCH ~~are to~~ are obtained. Moreover, in the uplink continuous transmission is used for reasons of efficient and linear power amplifier operations and battery-life saving. Besides, power pulsing could induce audible interference to neighboring radio electric equipment and even to the terminal itself. Hence with continuous transmission, the CCTrCH bit rate R_s is to match the bit rate offered by the WCDMA sub-layer. Since WCDMA technology and in particular the use of Orthogonal Variable Spreading Factor codes implies the use of a discrete on-line physical bit rate function of the selected spreading factor as mentioned in the article by F. Adachi et al.: "Three-structured Generation of Orthogonal Spreading Codes with Different Lengths for Forward Link of DS-CDMA Mobile", published in Electronic Letters, vol. 33, no. 1, pages 27-28, 2 January 1997, the CCTrCH allowed bit rates are ~~discrete~~ discrete. Besides, it is variable on a frame-by-frame basis to accommodate variable bit rate services. Therefore the upper part of the physical layer is to make use of the discrete bit rate R_s and unique E_s/N_0 offered by the WCDMA interface through the CCTrCH. On each TrCH a specific BER or BLER 1 is to be reached and maintained through the course of the call/session using an appropriate transport format semi-static part (CRC size, coding type, interleaving depth and RM attribute) regardless

of the instantaneous bit rate conveyed. Rate matching is the mechanism used to realize the necessary rate adaptation (by repetition or puncturing) between the TrCHs and the CCTrCH. Fine QoS balancing is simultaneously obtained by unequal repetition or puncturing as a means to tune the required E_b/N_0 of each TrCH, minimizing the mobile transmission power requirement.

Please replace the paragraph beginning on page 8, line 14 with the following amended paragraph:

Introducing for each transport channel *i* a rate matching attribute representative of its quality requirement, $RM_i=\alpha\times(E_c/N_0)_i$ with α real coefficient independent of the transport ~~channel)~~ channel, the above set of (n+1) equations is now equivalent to

Please replace the paragraph beginning on page 8, line 19 with the following amended paragraph:

Two steps are performed for every radio frame in the 3GPP uplink rate matching process. The first one, the rate matching parameters determination algorithm, is global and entirely parameterized by the instantaneous bit rates of the different TrCHs (i.e. $N_{i,j}$/10 ms) and the relative quality requirement of every TrCH compared to any other TrCH of the multiplex. It consists of determining the instantaneous physical bit rate that will be necessary to convey the TrCH data flows (or equivalent $N_{data,j}$) and the ~~of the~~ amount of spreading bits to be repeated or punctured among the multiplexed TrCHs, i.e. $\Delta N_{i,j}$ for all i=1 . . . n. In a second step the exact repeating or puncturing pattern is performed separately on each TrCH on the block of bits output of the radio frame segmentation. This predefined pattern is fully parameterized by the coding type and $\Delta N_{i,j}$, determined in the first step. The set of equations (5) constitutes the basis for the 3GPP rate matching parameters determination algorithm (3GPP Technical Specification 25.212, Multiplexing and Channel Coding). $\Delta N_{i,j}$ values are computed iteratively in accordance with equations (5). RM_i values are chosen to be integer values ranging from 1 to 256 for easy ~~signalling~~ signaling purposes. Rounding to the next lower integer is also used to

compute the exact amount of bits to be repeated or punctured. This procedure guarantees that exactly the same results are found when the rate matching parameters determination algorithm is executed by any two different entities in the system, computation rounding inaccuracies being avoided.

Please replace the paragraph beginning on page 9, line 21 with the following amended paragraph:

[0032] 3--If more than one physical data channel would be required performing repetition on all TrCHs, puncturing is allowed in the aim of minimizing the number of physical data channels needed, provided a given puncturing limit is not ~~by passed~~ bypassed on any TrCH.